the function normally associated with it. Removing a transistor from a radio, to use another of Gregory's examples (Gregory, 1968), may cause the radio simply to hum, perhaps giving the misleading suggestion that the transistor was a hum suppressor. Nonetheless, inhibiting or removing a part sometimes provides important clues as to what operation it performed. For example, if removing a particular enzyme inhibits a reaction and thereby an entire function (e.g., fermentation) and also leads to the build-up within the system of another substance, then it provides evidence both that the reaction contributes to that function and that the accumulating substance was an actual intermediate (or the product of a further reaction on that intermediate). Although single clues of this type are subject to multiple interpretations, the results of multiple different inhibitions within the system often provide insight into what operations different parts are performing.

The complement to inhibiting an operation is to stimulate it. For example, investigators can supply additional amounts of what they think is an intermediate substance in a chemical pathway and determine whether that results in a greater output from the pathway. This too can lead to anomalous results, either because the substance did not reach the right point in the pathway or because, without other components cooperating appropriately (perhaps via feedback loops), the operation was blocked. Often the stimulation technique can be fruitfully combined with an inhibition. For example, investigators might inhibit a reaction by removing the enzyme needed to obtain a particular product but also supply the product from outside. If the ultimate product of the reaction pathway continues to be produced normally, then the investigators can have high confidence that the enzyme they removed was part of the normal pathway.

Both inhibition and stimulation studies involve manipulating a component in the normal operation of the mechanism and detecting the consequences. Sometimes it is possible to observe the operation of the components directly. One example is single neuron recording in neuroscience, in which an electrode is inserted near a neuron and then various stimuli are presented to see which types produce increased (or decreased) spiking. Another example is radioactive tracer experiments, in which researchers label a substrate with a radioactive component and then detect where the radioactivity later appears within the mechanism. When such recordings are possible, they often provide the most compelling evidence of the sequence of internal processes. They do not, however, reveal the nature of the operation involved at each locus; hence, recording studies usually must still be combined with inhibition or stimulation studies to determine the operations.